



Section 7: Trade and Industrial Education 2006-2007

Need course information?

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Section 7: Trade and Industrial Education

Course Descriptions, Sequences, Certifications, Career Clusters

Section Overview

This section presents course information applicable to the Trade and Industrial Education program area: course descriptions, course concentration and specialization sequences, certifications available to course completers, and career clusters. Following the course description, the remainder of the information for each course or course sequence is presented in a chart. The following definitions and criteria are summarized to clarify and enhance the chart components.

Sequences

- A *concentration* is a coherent sequence of courses completed by a student in a specific career area as identified in this planning guide.
- A *specialization* is a choice by a student to specialize in an occupational field by taking additional courses in a specific career area as identified in this planning guide.
- A career and technical education *completer* is a student who has met the requirements for a career and technical concentration or specialization and all requirements for high school graduation or an approved alternative education program.

Certifications/Licenses/Assessments Available

Certain courses enable student completers to earn industry certification, a state license, and/or a national certification. These credentials are beneficial (and sometimes essential) to students seeking employment in a career field or occupational specialty. In addition, students who obtain these credentials earn verified credits toward graduation.

- A *standard credit* is based on a minimum of 140 clock hours of instruction and successful completion of the requirements of the course.
- A *verified credit* is based on a standard credit plus a passing score on the end-of-course SOL test (or other test as described in the Standards of Accreditation 8 VAC 20-131-110). A standard credit may not be verified more than once.
- A *student-selected verified credit* is a credit for a course that includes a test (other than SOL) approved by the Virginia Board of Education.

For students to be eligible to receive student-selected verified credits, their teacher must be certified by the issuing organization relative to the industry certification or licensure. In the case of a CTE program area where there are potential multiple certifications, the teacher must be certified in at least one industry certification that is related to the course and/or course sequence. ***Exception:*** There is no teacher certification requirement for students to receive verified credits upon passing a selected NOCTI assessment related to their CTE program.

Verified credits (other than those earned through NOCTI) entitle students to the Career and Technical Education diploma seal. Some verified credits earn students the Advanced Mathematics and Technology seal. Each year, the Virginia Board of Education approves the industry certifications that enable students to earn these seals.

Additional information and the relationships among Board-approved examinations, verified credits, and diploma seals are explained in the Introduction and in Section 9. Additional information, including the description of each credential, how to earn it, and courses that may prepare students for examination, is contained in Section 10: Descriptions of Certifications, Licenses, and Assessments.

Career Clusters

To help students investigate careers and design their courses of study to advance their career goals, the Office of Career and Technical Education Services in Virginia has adopted the nationally accepted structure of career clusters, career pathways, and sample career specialties or occupations.

To simplify federal reporting, *The Career and Technical Education Reporting System (CTERS) User's Manual* assigns a career cluster to each course. The cluster is also listed here.

Additional information and samples of CTE course selection using career clusters are included in Section 11: Instructional Planning with Career Clusters, Career Pathways, and Occupations.

Communications and Graphics

Advertising Design I 8570

Grade Level: 10 or 11

Advertising Design II 8571

Grade Level: 11 or 12

Prerequisite: Advertising Design I

Advertising Design III 8572

Grade Level: 12

Prerequisite: Advertising Design II

Students will learn the skills and principles involved in the development and function of advertising and the production process. Students will apply aesthetic theories and technical skills to graphic design objectives. Elements covered are design, illustration, typography, photography, computer graphics, advertising techniques, and preparation of camera-ready copy for print material.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none">Advertising Design I 8570Advertising Design II 8571Advertising Design III 8572 or ICT 8904 if needed for local scheduling option	Available upon completion of Advertising Design sequence: <ul style="list-style-type: none">Advertising Design Assessment (NOCTI)	Arts, Audio-Video Technology, and Communications

Basic Photography 8610

Grade Level: 10 or 11 (one year)

Students enrolled in this program will learn photographic skills such as using multiple camera formats to set up, shoot, process and present photographic images; creating images using digital technology and preparing a professional portfolio to prepare for a career in the field of photography.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Basic Photography 8610 and one of the following: <ul style="list-style-type: none"> Communications Systems 8415 Graphic Communications Systems 8458 	<ul style="list-style-type: none"> Basic Photography 8610 Communications Systems 8415 or Graphic Communications Systems 8458 and one of the following: Entrepreneurship Education 9094 Industrial Cooperative Training 8904 	N/A	Arts, Audio-Video Technology, and Communications

Commercial Photography I 8607

Grade Level: 10 or 11

Commercial Photography II 8608

Grade Level: 11 or 12

Prerequisite: Commercial Photography I

Commercial Photography III 8609

Grade Level: 12

Prerequisite: Commercial Photography II

Students learn to operate air brushes, cameras, meters, and other photographic equipment. Instructional topics include composition and color dynamics, contact printing, enlarging and developing film, and processing microfilm.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Commercial Photography I 8607 Commercial Photography II 8608 Commercial Photography III 8609 or ICT 8904 if needed for local scheduling option 	N/A	Arts, Audio-Video Technology, and Communications

Computer Networking Hardware Operations I 8542

Grade Level: 11 (18 weeks)

Computer Networking Hardware Operations II 8543

Grade Level: 11 (18 weeks)

Prerequisite: Computer Networking Hardware Operations I

Computer Networking Hardware Operations III 8544

Grade Level: 12 (18 weeks)

Prerequisite: Computer Networking Hardware Operations II

Computer Networking Hardware Operations IV 8545

Grade Level: 12 (18 weeks)

Prerequisite: Computer Networking Hardware Operations III

Students learn networking principles and the building and maintenance of computer networks in a Web-based, hands-on curriculum.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> Computer Networking Hardware Operations I 8542 Computer Networking Hardware Operations II 8543 Computer Networking Hardware Operations III 8544 Computer Networking Hardware Operations IV 8545 <ul style="list-style-type: none"> Information Technology Fundamentals 6670 or Information Technology in Production Systems 8496 may precede Computer Networking Hardware Operations I 8542. 	N/A	Cisco CCNA Academy Program Available upon completion of CNSO I and II: <ul style="list-style-type: none"> Introduction to Cisco Networking Technologies Examination Available upon completion of CNSO I*: <ul style="list-style-type: none"> Cisco CCNA 1, Networking Basics Examination Available upon completion of CNSO II*: <ul style="list-style-type: none"> Cisco CCNA 2, Routers Examination Available upon completion of CNSO III*: <ul style="list-style-type: none"> Cisco CCNA 3, Switching Examination Available upon completion of CNSO IV*: <ul style="list-style-type: none"> Cisco CCNA 4, WAN Technologies Examination *Pass any two of the four examinations. Available upon completion of CNSO I, II, III, IV: <ul style="list-style-type: none"> Interconnecting Cisco Networking Devices Examination 	Information Technology

Computer Repair and Servicing (Computer Maintenance) 8621

Grade Level: 10 or 11 (1 year)

Students enrolled in this course learn fundamental skills associated with maintenance of computers.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Computer Repair and Servicing 8621 and one of the following: <ul style="list-style-type: none"> Electronics Systems I 8416 Computer Control and Automation 8421 	<ul style="list-style-type: none"> Computer Repair and Servicing 8621 Electronics Systems I 8416 or Computer Control and Automation 8421 and one of the following: <ul style="list-style-type: none"> Entrepreneurship Education 9094 Industrial Cooperative Training 8904 	N/A	Information Technology

Computer Systems Technology I 8622

Grade Level: 10 or 11

Computer Systems Technology II 8623

Grade Level: 11 or 12

Prerequisite: Computer Systems Technology I

Computer Systems Technology III 8624

Grade Level: 12

Prerequisite: Computer Systems Technology II

Students learn to construct, troubleshoot, service, and repair computer systems, related components, and software, and install and maintain local area networks.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations	Information Technology Fundamentals 6670 or 8496 may precede Computer Systems Technology I 8622 <ul style="list-style-type: none"> • Computer Systems Technology I 8622 • Computer Systems Technology I 8623 • Computer Systems Technology III 8624 or ICT 8904 if needed for local scheduling option 	Available upon completion of Computer Systems Technology sequence: <ul style="list-style-type: none"> • A+ (CompTIA) • A+ Certification Operating Systems Technologies Examination (CompTIA) • A+ Certification Core Hardware Examination (CompTIA) • Brainbench Systems Administration Certification • Brainbench Technical Support Certification • Certified Computer Service Technician (ETA) • Fundamentals of Wireless LANs Certificate (Cisco Systems) • IT Essentials 1 Certificate (Cisco Systems) 	Information Technology
+Specific approved Brainbench Network Administration Certifications can be found at http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&cat2=22&cat3=24 +Specific approved Brainbench Technical Support Certifications can be found at http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&cat2=28			

Drafting I 8530

Grade Level: 10 or 11

Drafting II 8531

Grade Level: 11 or 12

Prerequisite: Drafting I

Drafting III 8532

Grade Level: 12

Prerequisite: Drafting II

Students learn theory and the manipulative skills necessary to produce complete and accurate drawings based on the ideas and sketches of engineers, architects, and designers. They design and prepare mechanical, structural, and architectural plans, electronics, transmitters, power supplies, and receivers relevant to consumer electronic products as they practice electronic product troubleshooting, servicing, and safety procedures.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> • Drafting I 8530 • Drafting II 8531 • Drafting III 8532 or ICT 8904 if needed for local scheduling option 	Available upon completion of Drafting sequence: <ul style="list-style-type: none"> • Architectural Drafting Assessment (NOCTI) • AutoCAD Certifications (Brainbench) • CAD Assessment ((NOCTI) • Drafter Certification (American Design Drafting Association) • General Drafting and Design (NOCTI) 	Architecture and Construction

Electronics Technology I 8536

Grade Level: 10 or 11

Electronics Technology II 8537

Grade Level: 11 or 12

Prerequisite: Electronics Technology I**Electronics Technology III 8538**

Grade Level: 12

Prerequisite: Electronics Technology II

Students learn to assemble, install, operate, maintain, repair, and troubleshoot electrical/electronic equipment used in industry and manufacturing. Digital and computer circuitry, synchro- and servomechanisms, mechanical power transfer systems, three-phase alternate current and electronic wave shaping are included in this program.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Electronics Technology I 8536 Electronics Technology II 8537 Electronics Technology III 8538 or ICT 8904 (if needed for local scheduling option) 	Available upon completion of Electronics Technology sequence: <ul style="list-style-type: none"> Certified Computer Service Technician (ETA) Certified Electronics Technician (CET) Associate (ETA) Certified Satellite Dish Installer (ETA) Electronic Technology Assessment (NOCTI) Student Electronics Technician Certification (SET) (ETA) Telecommunications Electronics Technician (ETA) 	Science, Technology, Engineering, and Mathematics

Graphic Imaging Technology I 8660

Grade Level: 10 or 11

Graphic Imaging Technology II 8661

Grade Level: 11 or 12

Prerequisite: Graphic Imaging Technology I**Graphic Imaging Technology III 8662**

Grade Level: 12

Prerequisite: Graphic Imaging Technology II

Graphic Imaging Technology prepares students for a career in what has traditionally been called the printing industry. Students learn to design and produce print media, which includes layout, electronic imaging, offset printing, bindery and finishing, and other graphic arts related to the printing industry. Graphic Imaging Technology programs may be certified by PrintED, the certification agency for Printing Industries of America. See Graphic Imaging Technology Framework for additional information.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Graphic Imaging Technology I 8660 Graphic Imaging Technology II 8661 Graphic Imaging Technology III 8662 or ICT 8904 if needed for local scheduling option 	Available upon completion of Graphic Imaging Technology sequence: <ul style="list-style-type: none"> Adobe Certified Expert (ACE) (Adobe Systems Incorporated) Brainbench Desktop Publishing Software Certifications+ Graphic Communication Technology Assessment (NOCTI) PrintED Certification (all exams) (Graphic Arts Education and Research Foundation) 	Arts, Audio-Video Technology, and Communications
+Specific approved Brainbench Desktop Publishing Software Certifications can be found at http://www.brainbench.com/xml/bb/common/testcenter/subcatresults.xml?cat1=9&cat2=10			

Radio Communications I 8640

Grade Level: 10 or 11

Radio Communications II 8641

Grade Level: 11 or 12

Prerequisite: Radio Communications I

Radio Communications III 8642

Grade Level: 12

Prerequisite: Radio Communications II

Students learn basic electricity and electronics, including all aspects of safety as well as related mathematics. Activities provide the skills for obtaining a radio-telephone operator license. Students learn practices related to the management and operation of a broadcasting station.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Radio Communications I 8640 Radio Communications II 8641 Radio Communications III 8642 or ICT 8904 if needed for local scheduling option 	N/A	Arts, Audio-Video Technology, and Communications

Robotic Workcell Technology I 8557

Grade Level: 10 or 11

Robotic Workcell Technology II 8558

Grade Level: 11 or 12

Prerequisite: Robotic Workcell Technology I

Robotic Workcell Technology III 8559

Grade Level: 12

Prerequisite: Robotic Workcell Technology II

This course provides instruction in basic computer programming, electronics, motor control, and feedback systems used in assembly and manufacturing settings. In addition, students learn how to program a microcontroller for robotic manipulation.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> • Robotic Workcell Technology I 8557 • Robotic Workcell Technology II 8558 • Robotic Workcell Technology III 8559 or ICT 8904 if needed for local scheduling option 	N/A	Science, Technology, Engineering, and Mathematics

Telecommunications I 8650

Grade Level: 10 or 11

Telecommunications II 8651

Grade Level: 11 or 12

Prerequisite: Telecommunications I

Students will learn about the technological and competitive advances now transforming the communications industry. This course will introduce students to the basic concepts and structural elements of voice, video, and data communications industry. Topics will include an introduction to signal transmission, attenuation, distortion, and signal propagation over cables, fiber, and air. User-premises based telecommunications platforms, switching, wiring, and networking, as well as facilities that provide and support telecommunications systems will be studied. Students will have the skills to become Certified Telecommunications Technicians, Satellite Technicians, and Certified Fiber Optics Technicians through Electronics Technicians Association International (ETA).

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> • Telecommunications I 8650 • Telecommunications II 8651 	N/A	Telecommunications Electronics Technician Certification (ETA)	Arts, Audio-Video Technology, and Communications

Television Production I 8688

Grade Level: 10 or 11

Television Production II 8689

Grade Level: 11 or 12

Prerequisite: Television Production I

Television Production III 8690

Grade Level: 12

Prerequisite: Television Production II

Students learn to operate equipment such as TV cameras, video tape recorders, microphones, audio mixers, and audio/video editing systems. They practice skills related to production, direction, and scripting of programs and set design and construction. Students also study control room procedures and responsibilities.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> • Television Production I 8688 • Television Production II 8689 • Television Production III 8690 or ICT 8904 if needed for local scheduling option 	Available upon completion of Television Production sequence: <ul style="list-style-type: none"> • Audio-Visual Communications Assessment (NOCTI) • Television Broadcasting Assessment (NOCTI) • Visual Communications Assessment (NOCTI) 	Arts, Audio-Video Technology, and Communications

Construction

Basic Carpentry 8600

Grade Level: 10 or 11 (one year)

Students enrolled in this program learn fundamental skills associated with layout, framing, and construction materials and install wooden products.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Basic Carpentry 8600 and one of the following: <ul style="list-style-type: none">• Technical Drawing/Design 8435• Construction Technology 8431• Materials and Processes 8433	Basic Carpentry 8600 and Technical Drawing/Design 8435 or Construction Technology 8431 or Materials and Processes 8433 and one of the following: <ul style="list-style-type: none">• Entrepreneurship Education 9094• Industrial Cooperative Training 8904	N/A	Architecture and Construction

Bricklayer 8549

Grade Level: 10 or 11 (1 year)

Students enrolled in this program learn the fundamental skills associated with laying block and brick.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Bricklayer 8549 and one of the following: <ul style="list-style-type: none">• Technical Drawing/Design 8435• Materials and Processes 8433• Construction Technology 8431	Bricklayer 8549 and Technical Drawing/Design 8435 or Construction Technology 8431 or Materials and Processes 8433 and one of the following: <ul style="list-style-type: none">• Entrepreneurship Education 9094• Industrial Cooperative Training 8904	N/A	Architecture and Construction

Building Trades I 8515

Grade Level: 10 or 11

Building Trades II 8516

Grade Level: 11 or 12

Prerequisite: Building Trades I

Building Trades III 8517

Grade Level: 12

Prerequisite: Building Trades II

This group of instructional programs prepares students to erect, install, maintain, and repair buildings, and other structures using materials such as metal, wood, stone, brick, glass, concrete and composition substances. Students develop skills in estimating costs; cutting, fastening, and fitting various materials; using hand and power tools; and following technical specifications and blueprints.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> • Building Trades I 8515 • Building Trades II 8516 • Building Trades III 8517 or ICT 8904 if needed for local scheduling option 	<p>Available upon completion of Building Trades sequence:</p> <ul style="list-style-type: none"> • Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute) • Core: Introductory Craft Skills, National Construction Career Test (NCCER) • Carpentry, National Construction Career Test (NCCER) • Carpentry Level One, National Construction Career Test (NCCER) • Carpentry: Residential Construction Academy Examination (Thomson Delmar/Home Builders Institute) • Electrical, National Construction Career Test (NCCER) • Electrical Principles: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute) • House Wiring: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute) • Masonry, National Construction Career Test (NCCER) • Plumbing Assessment (NOCTI) 	Architecture and Construction

Cabinetmaking I 8604

Grade Level: 10 or 11

Cabinetmaking II 8605

Grade Level: 11 or 12

Prerequisite: Cabinetmaking I

Cabinetmaking III 8606

Grade Level: 12

Prerequisite: Cabinetmaking II

Students learn workshop and tool safety and employability skills as they practice reading blueprints, estimating and selecting materials, layingout, cutting, shaping, assembling, fastening, applying wood veneers and plastic laminates, finishing surfaces, transporting and installing cabinets, cabinet components, and interior finishes. The technical, problem-solving, leadership, and creative skills learned in Cabinetmaking can be applied in industries well beyond the construction trades and professions and prepare the student for lifelong learning and success.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Cabinetmaking I 8604 Cabinetmaking II 8605 Cabinetmaking III 8606 or ICT 8904 if needed for local scheduling option 	Available upon completion of Cabinetmaking sequence: <ul style="list-style-type: none"> Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute) Core: Introductory Craft Skills, National Construction Career Test (NCCER) Cabinetmaking Assessment (NOCTI) Carpentry: Residential Construction Academy Examination (Thomson Delmar/Home Builders Institute) 	Architecture and Construction

Carpentry I 8601

Grade Level: 10 or 11

Carpentry II 8602

Grade Level: 11 or 12

Prerequisite: Carpentry I

Carpentry III 8603

Grade Level: 12

Prerequisite: Carpentry II

In this program students lay out, fabricate, erect, install, and repair wooden structures and fixtures, using hand and power tools. Instruction in common systems of framing, construction materials, estimating, and blueprint reading is included.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Carpentry I 8601 Carpentry II 8602 Carpentry III 8603 or ICT 8904 if needed for local scheduling option 	Available upon completion of Carpentry sequence: <ul style="list-style-type: none"> Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute) Core: Introductory Craft Skills, National Construction Career Test (NCCER) Carpentry Assessment (NOCTI) Carpentry, National Construction Career Test (NCCER) Carpentry Level One, National Construction Career Test (NCCER) Carpentry: Residential Construction Academy Examination (Thomson Delmar/Home Builders Institute) 	Architecture and Construction

Building Management I 8590

Grade Level: 10 or 11

Building Management II 8591

Grade Level: 11 or 12

Prerequisite: Building Management I**Building Management III 8592**

Grade Level: 12

Prerequisite: Building Management II

Students obtain the knowledge and skills to perform the upkeep of commercial and public buildings and grounds through hands-on training in cleaning operations, building repairs, plumbing, and grounds maintenance.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> • Building Management I 8590 • Building Management II 8591 • Building Management III 8592 or ICT8904 if needed for local scheduling option 	N/A	Hospitality and Tourism

Electricity I 8533

Grade Level: 10 or 11

Electricity II 8534

Grade Level: 11 or 12

Prerequisite: Electricity I**Electricity III 8535**

Grade Level: 12

Prerequisite: Electricity II

Students develop skills in the installation, operation, maintenance, and repair of residential, commercial, and industrial electrical systems. They also study DC and AC motors, controls, and electrical-distribution panels.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> • Electricity I 8533 and • Electricity II 8534 and • Electricity III 8535 or ICT 8904 if needed for local scheduling option 	<p>Available upon completion of Electricity sequence:</p> <ul style="list-style-type: none"> • Core: Introductory Craft Skills, National Construction Career Test (NCCER) • Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute) • BICSI Registered Installer, Level 1 (BICSI/International Telecommunications Association) • Certified Fiber Optics Installer (Association of Communications and Electronics Schools, International) • Certified Satellite Disk Installer (ETA) • Construction Electricity Assessment (NOCTI) • Copper-Based Cabling Certification (RBT Systems) • Data Cabling Installer Certification (ETA) • Electrical Construction Assessment (NOCTI) • Electricity, National Construction Career Test (NCCER) • Electrical Principles: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute) • Fiber Optics Installer (ETA) • Fiber Optic Network Cabling Certification (RBT Systems) • Graymark Cable Installation Certification (Graymark International) • House Wiring: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute) • Voice and Data Cabling Certification (Cisco Systems) 	Architecture and Construction

Heating, Ventilation, Air Conditioning, and Refrigeration (HVACR) I 8503

Grade Level: 10 or 11

HVACR II 8504

Grade Level: 11 or 12

Prerequisite: HVACR I

HVACR III 8505

Grade Level: 12

Prerequisite: HVACR II

This instructional program prepares students to install, repair, and maintain the operating conditions of heating, air conditioning, and refrigeration systems.

Completion of this sequence may prepare students for certification exams for a variety of air conditioning/air distribution system technicians.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> • Heating, Ventilation, Air Conditioning, and Refrigeration (HVACR) I 8503 • HVACR II 8504 • HVACR III or ICT 8904 if needed for local scheduling option 	Available upon completion of HVACR sequence: <ul style="list-style-type: none"> • Air Conditioning Certification (HVAC Excellence) • Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute) • Commercial Air Conditioning Certification (HVAC Excellence) • Commercial Refrigeration (HVAC Excellence) • Core, Introductory Craft Skills, National Construction Career Test (NCCER) • Electrical Certification (HVAC Excellence) • Electric Heat Certification (HVAC Excellence) • EPA Technician Certification (Core, Levels I, II, or III) (Environmental Protection Agency) • Gas Heat Certification (HVAC Excellence) • Heating, Electrical, Air Conditioning Technology (HEAT) Examination (HVAC Excellence) • Heat Pump Certification (HVAC Excellence) • HVAC, National Construction Career Test (NCCER) • HVAC: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute) • Installer/Service Core Certification (NATE) • Light Commercial Heating & Air Conditioning (ARI) • Oil Heat Certification (HVAC Excellence) • Residential Air-Conditioning and Heating Certification (ARI) 	Science, Technology, Engineering, and Mathematics

Masonry I 8512

Grade Level: 10 or 11

Masonry II 8513

Grade Level: 11 or 12

Prerequisite: Masonry I

Masonry III 8514

Grade Level: 12

Prerequisite: Masonry II

Students learn to use hand tools such as trowels, levels, and chisels and power tools such as concrete mixers to lay brick, concrete block, tile, and related materials.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Masonry I 8512 Masonry II 8513 Masonry III 8514 or ICT 8904 if needed for local scheduling option 	Available upon completion of Masonry sequence: <ul style="list-style-type: none"> Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute) Core, Introductory Craft Skills, National Construction Career Test (NCCER) Construction Masonry—Blocklaying Assessment (NOCTI) Construction Masonry—Bricklaying Assessment (NOCTI) Masonry, National Construction Career Test (NCCER) 	Architecture and Construction

Plumbing I 8551

Grade Level: 10 or 11

Plumbing II 8552

Grade Level: 11 or 12

Prerequisite: Plumbing I

Plumbing III 8553

Grade Level: 12

Prerequisite: Plumbing II

Students learn to assemble, install, and repair pipes, fittings, and fixtures of heating, water, and drainage systems, according to specification and plumbing codes.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Plumbing I 8551 Plumbing II 8552 Plumbing III 8553 or ICT 8904 if needed for local scheduling option 	Available upon completion of Plumbing sequence: <ul style="list-style-type: none"> Core, Introductory Craft Skills, National Construction Career Test (NCCER) Basic Principles of Construction: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute) Plumbing Assessment (NOCTI) Plumbing: Residential Construction Academy Examination (Thomson Delmar Learning/Home Builders Institute) 	Architecture and Construction

Utility/Heavy Construction Technology I 8616

Grade Level: 10 or 11

Utility/Heavy Construction Technology II 8617

Grade Level: 11 or 12

Prerequisite: Utility/Heavy Construction Technology I

Utility/Heavy Construction Technology III 8618

Grade Level: 12

Prerequisite: Utility/Heavy Construction Technology II

This program provides both the knowledge and the hands-on skills needed to secure a job as a construction equipment operator. Students learn about site grading and development, excavation, concrete structures, pipe laying, road building, and other topics. They have the opportunity to gain experience in operating excavators, bulldozers, loaders, and motor graders. Completion of this sequence may prepare students for the certification exam for medium/heavy truck technician or parts specialist.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Utility/Heavy Construction Technology I 8616 Utility/Heavy Construction Technology II 8617 Utility/Heavy Construction Technology III 8618 or ICT 8904 if needed for local scheduling option 	N/A	Architecture and Construction

Metals

Industrial Maintenance Technology (IMT) I 8575

Grade Level: 10 or 11

IMT II 8576

Grade Level: 11 or 12

Prerequisite: IMT I

IMT III 8577

Grade Level: 12

Prerequisite: IMT II

This program focuses on the adjustment, maintenance, part replacement, and repair of tools, equipment, and machines used in industry, including hydraulic and pneumatic systems.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none">Industrial Maintenance Technology I 8575Industrial Maintenance Technology II 8576Industrial Maintenance Technology III 8577 or ICT 8904 if needed for local scheduling option	Available upon completion of Industrial Maintenance Technology sequence: <ul style="list-style-type: none">EPA Technician Certification (Core, Levels I, II, or III) (Environmental Protection Agency)Industrial Maintenance Mechanic Assessment (NOCTI)	Manufacturing

Precision Machining Technology (PMT) I 8539

Grade Level: 10 or 11

PMT II 8540

Grade Level: 11 or 12

Prerequisite: PMT I

PMT III 8541

Grade Level: 12

Prerequisite: PMT II

Students learn the basics of industrial safety and environmental protection; planning, management, and performance of machining jobs; quality control; process improvement; general maintenance; engineering drawings and sketches; and application of measurements, metalworking theory, properties of materials, and principles of CNC. Precision Machining Technology programs may be certified by NTMA (National Tooling and Machining Association), the certifying agency for the National Institute for Metalworking Skills (NIMS). See Precision Machining Technology Framework for additional information.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Precision Machining Technology I 8539 Precision Machining Technology II 8540 Precision Machining Technology III 8541 or ICT 8904 if needed for local scheduling option 	Available upon completion of Precision Machining Technology sequence: <ul style="list-style-type: none"> Machining Skills Level 1—Drill Press (NIMS) Machining Skills Level 1—Milling Machine (NIMS) Machining Skills Level 1—Measurements, Materials, and Safety (NIMS) Precision Machining (NOCTI) 	Manufacturing

Sheet Metal I 8663

Grade Level: 10 or 11

Sheet Metal II 8664

Grade Level: 11 or 12

Prerequisite: Sheet Metal I

Sheet Metal III 8665

Grade Level: 12

Prerequisite: Sheet Metal II

Students work with materials that are cast, formed, shaped, molded, heat treated, cut, twisted, pressed, fused, or stamped. Instruction includes the planning, manufacturing, assembling, testing, and repairing of mechanisms, machines, and structures.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Sheet Metal I 8663 Sheet Metal II 8664 Sheet Metal III 8665 or ICT 8904 if needed for local scheduling option 	Available upon completion of Sheet Metal sequence: <ul style="list-style-type: none"> Metalworking and Fabrication (NOCTI) 	Manufacturing

Welding I 8672

Grade Level: 10 or 11

Welding II 8673

Grade Level: 11 or 12

Prerequisite: Welding I

Welding III 8674

Grade Level: 12

Prerequisite: Welding II

Students learn to use gases and/or welding processes and to braze and solder metal parts according to diagrams, blueprints, or written specifications.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Welding I 8672 and Welding II 8673 and Welding III 8674 or ICT 8904 if needed for local scheduling option 	Available upon completion of Welding sequence: <ul style="list-style-type: none"> Core, Introductory Craft Skills, National Construction Career Test (NCCER) SENSE (American Welding Society) Welding (NOCTI) Welding, National Construction Career Test (NCCER) 	Manufacturing

Personal Services

Barbering I 8740

Grade Level: 10 or 11

Barbering II 8741

Grade Level: 11 or 12

Prerequisite: Barbering I

Barbering III 8742

Grade Level: 12

Prerequisite: Barbering II

Barbering is the study of hair, scalp, and skin. Students study and prepare in a clinical lab setting, using mannequins and live models for manipulative practice. The program emphasizes safety and sanitation, communication, and management skills. Related areas of study include psychology, ethics, and professional image.

Competency completions prepare the students for the Virginia state licensing exam.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Barbering I 8740 Barbering II 8741 Barbering III 8742 or ICT 8904 if needed for local scheduling option 	Available upon completion of the Barbering sequence: <ul style="list-style-type: none"> Barbers license (Virginia Board of Barbers and Cosmetology, Department of Professional & Occupational Regulations) 	Human Services

Beauty Salon Assistant 8546

Grade Level: 10 or 11 (1 year)

The Beauty Salon Assistant course prepares students for work as an assistant in a hair salon. Students study and prepare in a clinical lab setting, learning practical and manipulative skills. The program emphasizes safety and sanitation, shampooing and conditioning, retailing, inventory control, and receptionist work. Competency completions allow students a certificate for job entry level employment.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Beauty Salon Assistant 8546 and one of the following: <ul style="list-style-type: none"> Nail Technician I 8692 Entrepreneurship Education 9094 	<ul style="list-style-type: none"> Beauty Salon Assistant 8546 Industrial Cooperative Training 8904 	N/A	Human Services

Commercial Sewing I 8524

Grade Level: 10 or 11

Commercial Sewing II 8525

Grade Level: 11 or 12

Prerequisite: Commercial Sewing I**Commercial Sewing III 8526**

Grade Level: 12

Prerequisite: Commercial Sewing II

Students become proficient in the operation of various types of sewing machines. Instruction includes design, construction, alteration, and fitting of wearing apparel.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Commercial Sewing I 8524 Commercial Sewing II 8525 Commercial Sewing III 8526 or ICT 8904 if needed for local scheduling option 	N/A	Manufacturing

Cosmetology I 8527

Grade Level: 10 or 11

Cosmetology II 8528

Grade Level: 11 or 12

Prerequisite: Cosmetology I**Cosmetology III 8529**

Grade Level: 12

Prerequisite: Cosmetology II

Cosmetology is the study of hair, skin, and nails and their related care. Students study and prepare in a clinical lab setting, using mannequins and live models for manipulative skill practice. The program emphasizes safety and sanitation, communication, and management skills. Related areas of study include psychology, ethics, and presentation of a professional image. Competency completions prepare the student for the Virginia state licensing exam.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Cosmetology I 8527 Cosmetology II 8528 Cosmetology III 8529 or ICT 8904 if needed for local scheduling option 	Available upon completion of Cosmetology sequence: <ul style="list-style-type: none"> Cosmetology (Virginia Board of Barbers and Cosmetology, Department of Professions & Occupational Regulations) Cosmetology (NOCTI) 	Human Services

Nail Technician I 8692

Grade Level: 10 or 11

Nail Technician II 8693

Grade Level: 11 or 12

Prerequisite: Nail Technician I

Students learn to manicure, pedicure, install and maintain artificial nails, and apply concepts associated with bacteriology, sanitation, nail disorders, anatomy and physiology, and safety. The course requires a minimum of 540 hours. Completion prepares students for the Virginia state licensing examination in Nail Technician.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> Nail Technician I 8692 and Nail Technician II 8693 	N/A	Available upon completion of Nail Technician sequence: <ul style="list-style-type: none"> Nail Technician (Virginia Board of Barbers and Cosmetology, Department of Professional & Occupational Regulations) 	Human Services

Protective Services**Criminal Justice I 8702**

Grade Level: 10 or 11

Criminal Justice II 8703

Grade Level: 11 or 12

Prerequisite: Criminal Justice I**Criminal Justice III 8704**

Grade Level: 12

Prerequisite: Criminal Justice II

Students learn the principles, techniques, and practices for pursuing careers within the criminal justice services system.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Criminal Justice I 8702 Criminal Justice II 8703 Criminal Justice III 8704 or ICT 8904 if needed for local scheduling option 	Available upon completion of Criminal Justice sequence: <ul style="list-style-type: none"> Criminal Justice (NOCTI) 	Law, Public Safety, Corrections, and Security

Firefighting I 8705

Grade Level: 10 or 11

Firefighting II 8706

Grade Level: 11 or 12

Prerequisite: Firefighting I**Firefighting III 8707**

Grade Level: 12

Prerequisite: Firefighting II

Students learn to fight fires and control the outbreak of fire. Instruction includes fire department organization; use of various kinds of equipment such as extinguishers, pumps, hoses, ropes, ladders, gas masks, hydrants, and standpipe and sprinkler systems; methods of entry and rescue; salvage practices and equipment; and fire and arson inspection and investigation techniques.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Firefighting I 8705 Firefighting II 8706 Firefighting III 8707 or ICT 8904 if needed for local scheduling option 	Available upon completion of Firefighting sequence: <ul style="list-style-type: none"> Firefighter Level I Certification (Virginia Department of Fire Programs) 	Law, Public Safety, Corrections, and Security

Public Safety I 8700

Grade Level: 11 or 12

Public Safety II 8701

Grade Level: 12

Prerequisite: Public Safety I

Students learn basic procedures related to law enforcement and fire fighting occupations, including emergency medical services, traffic control, safety, crowd control, and fire prevention technology. The course requires a minimum of 540 hours.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> Public Safety I 8700 Public Safety II 8701 	N/A	N/A	Law, Public Safety, Corrections, and Security

Transportation

Aircraft Pilot Training I 8731

Grade Level: 10 or 11

Aircraft Pilot Training II 8732

Grade Level: 11 or 12

Prerequisite: Aircraft Pilot Training I

Aircraft Pilot Training III 8733

Grade Level: 12

Prerequisite: Aircraft Pilot Training II

Students participate in flight training, ground school, and simulator instruction to support the flight syllabus while studying meteorology, aerodynamics, navigation, physiology, airfield and flight environments, aircraft maneuvers, and aircraft weight and balance.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations	<ul style="list-style-type: none"> Aircraft Pilot Training I 8731 Aircraft Pilot Training II 8732 Aircraft Pilot Training III 8733 or ICT8904 if needed for local scheduling option 	N/A	Transportation, Distribution, and Logistics

Aviation Maintenance Technology I 8728

Grade Level: 11

Aviation Maintenance Technology II 8729

Grade Level: 12

Prerequisite: Aviation Maintenance Technology I

Students study aircraft systems and components, technical diagrams and charts, aerodynamics, basic electricity, and electronics as specified by FAA requirements.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> Aviation Maintenance Technology I 8728 and Aviation Maintenance Technology II 8729 	N/A	N/A	Transportation, Distribution, and Logistics

Automotive Body Technology I—Certified 8676

Grade Level: 10 or 11

Automotive Body Technology II—Certified 8677

Grade Level: 11 or 12

Prerequisite: Auto Body Technology I—Certified

Automotive Body Technology III—Certified 8678

Grade Level: 12

Prerequisite: Auto Body Technology II—Certified

Students learn to repair, mask, and refinish vehicles or body components. In addition, they learn the application of primers, sealers, and other prep coats and to practice maintenance and safety procedures.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Automotive Body Technology I—Certified 8676 Automotive Body Technology II—Certified 8677 Automotive Body Technology III—Certified 8678 or ICT 8904 if needed for local scheduling option 	Available upon completion of Automotive Body Technology sequence: <ul style="list-style-type: none"> Collision Repair (NOCTI) Collision Repair/Refinishing Technology (NOCTI) Collision Repair & Refinish Test Series (any exam) (NATEF) Refinishing Technology Assessment (NOCTI) 	Transportation, Distribution, and Logistics

Automotive Body Repair I—Non-Certified 8679

Grade Level: 10 or 11

Automotive Body Repair II—Non-Certified 8680

Grade Level: 11 or 12

Prerequisite: Auto Body Repair I

Automotive Body Repair III—Non-Certified 8681

Grade Level: 12

Prerequisite: Auto Body Repair II

Students learn to repair, mask, and refinish vehicles or body components. In addition, they learn the application of primers, sealers, and other prep coats and to practice maintenance and safety procedures.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Automotive Body Technology I—Non-Certified 8679 Automotive Body Technology II—Non-Certified 8680 Automotive Body Technology III—Non-Certified 8681 or ICT 8904 if needed for local scheduling option 	Available upon completion of Automotive Body Repair sequence: <ul style="list-style-type: none"> Collision Repair (NOCTI) Collision Repair/Refinishing Technology (NOCTI) Collision Repair & Refinish Technician (any exam) (NATEF) Refinishing Technology Assessment (NOCTI) 	Transportation, Distribution, and Logistics

Basic Automotive Body Repair 8675

Grade Level: 10 or 11 (1 year)

Students learn fundamental skills associated with safe use of hand and power tools and the use of spray guns to refinish the modern automobile.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Basic Automotive Body Repair 8675 and one of the following: <ul style="list-style-type: none"> Materials and Processes 8433 Principles of Technology I 9811 	Basic Automotive Body Repair 8675 and Materials and Processes 8433 or Principles of Technology I 9811 and one of the following: <ul style="list-style-type: none"> Entrepreneurship Education 9094 Industrial Cooperative Training 8904 	N/A	Transportation, Distribution, and Logistics

Automotive Technology I — Certified 8506

Grade Level: 10 or 11

Automotive Technology II — Certified 8507

Grade Level: 11 or 12

Prerequisite: Auto Technology I—Certified**Automotive Technology III — Certified 8508**

Grade Level: 12

Prerequisite: Auto Technology II—Certified

Students learn to repair fuel, electrical, cooling, brake, drive train, and suspension systems. Instruction is given also in the adjustment and repair of individual components and systems such as radiators, transmission, and carburetors. Programs are certified by ASE, allowing students to prepare for the following certification, depending on local program content: Automotive Technician, Engine Machinist, Medium and Heavy Truck Technician, School bus Technician, and Parts Specialist—Automotive or Medium/Heavy Truck.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Automotive Technology I—Certified 8506 Automotive Technology II—Certified 8507 Automotive Technology III—Certified 8508 or ICT 8904 if needed for local scheduling option 	Available upon completion of Automotive Technology sequence: <ul style="list-style-type: none"> Automotive Technician (ASE) Automotive Youth Education Systems Exit Examinations (AYES) National Automotive Technicians Education Foundation (NATEF) End of Program Test Series Examinations (NATEF) Parts Specialist: Automobile or Medium/Heavy Truck (ASE) 	Transportation, Distribution, and Logistics

Automotive Servicing I — Non-Certified 8710

Grade Level: 10 or 11

Automotive Servicing II — Non-Certified 8711

Grade Level: 11 or 12

Prerequisite: Auto Servicing I**Automotive Servicing III — Non-Certified 8712**

Grade Level: 12

Prerequisite: Auto Servicing II

Students learn to make minor repairs, tune engines, and practice routine maintenance procedures. The study of electrical systems and components of the cooling system is included.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Automotive Servicing I—Non-Certified 8710 Automotive Servicing II—Non-Certified 8711 Automotive Servicing III Non-Certified 8712 or ICT 8904 if needed for local scheduling option 	Available upon completion of Automotive Servicing sequence: <ul style="list-style-type: none"> Automotive Technician (ASE) Automotive Youth Education Systems Exit Examinations (AYES) National Automotive Technicians Education Foundation End of Program Test Series Examinations (NATEF) Parts Specialist: Automobile or Medium/Heavy Truck (ASE) 	Transportation, Distribution, and Logistics

Automotive Maintenance 8709

Grade Level: 10 or 11 (1 year)

Students enrolled in this course learn fundamental skills associated with engine tune-up, electrical diagnosis and repair, lubrication and cooling system diagnosis and repair, brake system diagnosis and repair, basic fuel system diagnosis and repair, basic suspension system diagnosis and repair, and basic routine maintenance of automobiles.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Automotive Maintenance 8709 and one of the following: <ul style="list-style-type: none"> Principles of Technology I 9811 Power and Transportation 8445 Energy and Power 8448 	Automotive Maintenance 8709 and Principles of Technology I 9811 or Power and Transportation 8445 or Energy and Power 8448 and one of the following: <ul style="list-style-type: none"> Entrepreneurship Education 9094 Industrial Cooperative Training 8904 	N/A	Transportation, Distribution, and Logistics

Diesel Equipment Technology I 8613

Grade Level: 10 or 11

Diesel Equipment Technology II 8614

Grade Level: 11 or 12

Prerequisite: Diesel Equipment Technology I

Diesel Equipment Technology III 8615

Grade Level: 12

Prerequisite: Diesel Equipment Technology II

Students receive instruction in general maintenance and overhaul of diesel equipment. They learn to inspect, maintain, and repair tracks, wheels, brakes, operating controls, pneumatic and hydraulic systems, electrical circuitry, and engines. They practice welding and brazing techniques.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> Diesel Equipment Technology I 8613 Diesel Equipment Technology II 8614 Diesel Equipment Technology III 8615 or ICT 8904 if needed for local scheduling option 	Diesel Engine Mechanics Assessment (NOCTI)	Transportation, Distribution, and Logistics

Motorsports Technology I 8509

Grade Level: 10 or 11

Motorsports Technology II 8510

Grade Level: 11 or 12

Prerequisite: Motorsports Technology I**Motorsports Technology III 8511**

Grade Level: 12

Prerequisite: Motorsports Technology II

Motorsports Technology includes instruction in the principles of racecar fabrication and all facets of the racing industry. Technical facets of the course include chassis preparation, engine machine technology, racing protocol, and regulatory compliance. Business aspects of the motor sports industry are also included.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> • Motorsports Technology I 8509 • Motorsports Technology II 8510 • Motorsports Technology III 8511 or ICT 8904 if needed for local scheduling option 	N/A	Transportation, Distribution, and Logistics

Small Engine Technology I 8725

Grade Level: 10 or 11

Small Engine Technology II 8726

Grade Level: 11 or 12

Prerequisite: Small Engine Technology I**Small Engine Technology III 8727**

Grade Level: 12

Prerequisite: Small Engine Technology II

Students learn to maintain and repair small internal-combustion engines used on portable power equipment such as lawnmowers, chain saws, rotary tillers, motorcycles, and snowmobiles, and other 2- and 4 cycle engines.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
All T&I courses available for the 3-year scheduling option are listed as specializations.	<ul style="list-style-type: none"> • Small Engine Technology I 8725 • Small Engine Technology II 8726 • Small Engine Technology III 8727 or ICT 8904 if needed for local scheduling option 	Available upon completion of Small Engine Technology sequence: <ul style="list-style-type: none"> • Air Cooled Gas Engine Repair (NOCTI) • Outdoor Power Equipment Certification (EETC) 	Transportation, Distribution, and Logistics

Small Engine Repair 8724**Grade Level:** 10 or 11 (1 year)

Students enrolled in this program learn skills associated with general maintenance and repair of lawnmowers, rotary tillers and portable power equipment.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
Basic Small Engine Repair 8724 and one of the following: <ul style="list-style-type: none"> Agricultural Power and Equipment 8016 Small Engine Repair 8082 	Basic Small Engine Repair 8724 and Agricultural Power and Equipment 8016 or Small Engine Repair 8082 and one of the following: <ul style="list-style-type: none"> Entrepreneurship Education 9094 Industrial Cooperative Training 8904 	N/A	Transportation, Distribution, and Logistics

Cooperative Education

Industrial Cooperative Training—non co-op 8901

Grade Level: 10

Industrial Cooperative Training I—co-op 8902

Grade Level: 11 or 12

Industrial Cooperative Training II—co-op 8903

Grade Level: 12

Prerequisite: ICT I

Industrial Cooperative Training—Senior Intensified Program 8904

Grade Level: 12

Students have the opportunity to prepare for employment related to the many fields within the areas of trade, industrial, or technical occupations. Each student receives on-the-job training and instruction related to his or her chosen trade area. The ICT SIP program can be operated as an extension of any day-trade program.

Concentration Sequences	Specialization Sequences	Certification/License/Assessment Available	Career Cluster
<ul style="list-style-type: none"> ICT 8901 (non co-op) ICT 8902 (co-op) 	<ul style="list-style-type: none"> ICT 8901 (non co-op) ICT 8902 (co-op) ICT 8903 (co-op) 	N/A	Choose the family most closely aligned to the content of the course.

Special Programs

Trade and Industrial Education Dual Enrollment with Postsecondary 8801

Information is available from the Trade and Industrial Education Service, Virginia Department of Education.